Saturday, May 18, 2013 UC Davis Conference Center

The 3rd Annual Conference on Integrated Computing and **STEM** Education The UC Davis Center for Integrated Computing and STEM Education (C.S.





http://c-stem.ucdavis.edu

N elcome to the 3rd Annual Conference on Integrated Computing and STEM Education

The UC Davis Center for Integrated Computing and STEM Education (**C-STEM**) is hosting this important event in partnership with the California Department of Education, partner school districts and county offices of education . Funding is provided by the National Science Foundation.

The Center's overarching goals are to close the achievement gap by broadening participation of students traditionally underrepresented in computing and **STEM** subjects and to develop students' computer-aided problem-solving skills through engagement in real-world **STEM** problems.

The conference provides a forum for K-14 **STEM** teachers, researchers, educators, policy makers and industrial partners to discuss and influence the future direction of integrated computing and **STEM** education.

Conference Highlights:

Keynote address on "The Role of a Land-Grant Research University in K-12 STEM Education and Outreach in the 21st Century" by Dr. Ralph J. Hexter, Provost and Executive Vice Chancellor of UC Davis.

Featured luncheon speech on **"K-12 Computing Education"** by Dr. Debra Richardson, Professor of Informatics and founding dean of the Donald Bren School of Information and Computer Sciences at the University of California, Irvine.

Plenary session speech **"C-STEM and College Career Readiness"** by Jonathan Raymond, Superintendent of the Sacramento City Unified School District

Featured panel session **"Best practices on integrated computing and STEM education with computer programming in C/C++ grades 7-12".** STEM teachers from the School of Engineering and Sciences in the SCUSD, chaired by Karen Shores, STEM Administrator with the California Department of Education. he successful implementation of the Common Core State Standards and the Next Generation Science Standards hinges on the creation and integration of authentic, project-based learning experiences that require students to engage in real-world problem solving. Inspired by this challenge, **The 3rd annual Conference on Integrated Computing and STEM Education** offers teachers, administrators and policy makers the opportunity to learn more about the C-STEM Center, its research work to date and the rich set of resources available to educators and students.

C-STEM partner teachers, their district and school administrators, as well as researchers, educators, policy makers and industrial partners will share their experiences, best practices, and ideas on integrated computing and STEM education in breakout sessions. The conference offers a first-hand opportunity to examine the groundbreaking work of the C-STEM Center on Integrated Computing and STEM Education in formal, afterschool, and informal settings. We invite you to review the evidence for their impact on increasing student motivation and achievement in STEM subjects, closing the achievement gap, and improving college and career-readiness skills.

We all know that classroom innovations require great teachers who can inspire students to believe that anything is possible. The conference provides a forum where we can recognize several outstanding STEM teachers with the **C-STEM Teacher of the Year Award** for their dedication and achievement on integrated computing and STEM education. Because great teachers, and inspired students are the heart and soul of great schools, the C-STEM will also be presenting **C-STEM School of the Year** certificates to schools for achieving excellence in integrated learning with computing and STEM subjects.

Join us in meeting the challenge of preparing all students for success in the global economy !

Sincerely,

Conference Planning Committee:

Ronda Adams, Associate Superintendent, Yolo County Office of Education Harry H. Cheng, Professor and C-STEM Center Director, UC Davis Brian Donnelly, Department Chair, Industrial Technology, Harper Junior High, DJUSD Karen Shores, STEM Administrator, California Department of Education Joe Stymeist, Career Technical Education Coordinator, Sacramento City Unified School District Jean VanderGheynst, Professor and C-STEM Center Co-Director, UC Davis Tobin White, Associate Professor, UC Davis





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8:00 – 8:30 am	Registration and Breakfast	Conference Center Lobby
8:30 - 8:40	Welcome and Introductions Dr. Harry H. Cheng, Professor and C-STEM Center Director Dr. Enrique Lavernia, Distinguished Professor and Dean of College of Engineering	Conference Center Ballroom A, B, C
8:40 -9:00	Keynote Address: Role of a Land-Grant Research University in K-12 STEM Education and Outreach in the 21st Century Dr. Ralph J. Hexter, Distinguished Professor, Provost & Executive Vice Chancellor	
9:00 – 9:40	Integrated Computing and STEM Education in the 21st Century Chair: Dr. Ronda Adams, Associate Superintendent, Yolo County Office of Education Speakers: Dr. Harry H. Cheng, Professor and C-STEM Center Director Rex Schrader, HP Engineer, Judge for RoboPlay Competition Carmen Wright, Math Teacher, Elkhorn Village Elementary School	Ballroom A, B, C
9:40 – 9:50	Plenary Address: C-STEM and College Career Readiness Speaker: Jonathan P. Raymond, Superintendent, Sacramento City Unified School District	Ballroom A, B, C
9:50 – 10:40	 Plenary Panel Session: Integrated Computing and STEM Education at School of Engineering and Sciences, Sacramento City Unified School District Chair: Karen Shores, STEM Administrator, California Department of Education Panelists: Joe Stymeist, CTE Coordinator, Sacramento City Unified School District Matt Turkie, Principal, School of Engineering and Sciences Dylan Besk, Math and Engineering Teacher, School of Engineering and Sciences Ryan Mangan, Engineering Teacher, School of Engineering and Sciences Thom Bauser, Science and Engineering Teacher, School of Engineering and Sciences Ken Davis, Engineering Teacher, School of Engineering and Sciences 	Ballroom A, B, C





	School of Engineering and Sciences in Sacramento City Unified School District introduces computer programming in C/C++ and robotics for all students starting in 7th grade using the C-STEM Pre-Algebra curriculum. Subsequently, the school uses C-STEM computer programming, Algebra I, C programming, 3D design and 3D printing for Mobot, other math and science courses, and college-level advanced computing curricula in each grade from 8 to 12. By the time students graduating from the school, they have six-year computing experience integrated in various STEM courses to be college and career ready. In this plenary panel session, school administrators and teachers will share their experiences on integrated computing and STEM education.	
10:40-11:00	Award presentation: C-STEM Teacher of the Year C-STEM School of the Year Presenters: Dr. Harry H. Cheng, C-STEM Center Director Dr. Enrique Lavernia, Distinguished Professor and Dean of College of Engineering Dr. Ralph J. Hexter, Distinguished Professor, Provost & Executive Vice Chancellor Michael Hardwick, Deputy Director, Advanced Weapon Systems Engineering, Sandia National Laboratories	Ballroom A, B, C
11:00 - 11:15	Coffee Break	Conference Center Foyer
11:15 – 12:15pm	Breakout Presentation, Discussion, and Demo Sessions	
Session 1	 Integrated Algebra Education with Computer Science, Technology, and Engineering Chair: Winfred Roberson, Superintendent, Davis Joint Unified School District Co-Chair: Grace Chin, Principal, Bridgeway Island Elementary School Presenters: "Common Core Math Standards in the C-STEM Curriculum, Engaging Female Students Learning Algebra I with Hands-on Computing and Robotics", Heidi Espindola, Math Teacher, St. Francis Catholic High School "Learning Pre-Algebra with Computing and Robotics for All Students in the 7th Grade", Dylan Besk, Math and Engineering Teacher, School of Engineering and Sciences "Integrating Computing and Robotics into Algebra I with ESL Students Group Teaching and Collaborative Learning", Clay Dagler, Math Teacher, Luther Burbank High School "Collaboratively Learning Algebra, Computing and Robotics in Classroom and Afterschool Program with Math Programming and RoboPlay Competitions", Francesca DeFazio, Math Teacher, Westmore Oaks Elementary School "Integrating Computer Programming into Engineering and Algebra I Education", Thom Bauser, Science and Engineering Teacher, School of Engineering and Sciences Advisory Commentators: Dr. Jane Liang, Education Research and Evaluation Consultant, California Department of Education Dr. Tobin White, Associate Professor, School of Education, UC Davis 	Ballroom B





Session 2	 Integrated Computing, Science, Engineering, and Career Technical Education (CTE) Chair: Michael Hardwick, Deputy Director, Advanced Weapon Systems Engineering, Sandia National Laboratories Co-Chair: Elizabeth Vigil, Principal, California Middle School Presenters: "CTE Standards in the C-STEM Curriculum, Integrating Computer Programming, Robotics, and 3D Design and 3D Printing into Applied Physics Education", Chris Schlesselman, Physics and Engineering Teacher, Hiram Johnson High School "Integrating Math Programming into Robotics Academy", Dr. Liliana Lazo, Math Teacher, Fred C Beyer High School "Integrating C-STEM Computing and Mobot Program into Science, Algebra, and Afterschool Program in a Middle School with One-to- One Computing/PBL Environment ", Tammy Lee, Math Teacher, American Canyon Middle School "Next Generation Science Standards in the C-STEM Curriculum, Integrating Computing and Robotics into Science Education", Jada Saul, Science Teacher, Riverbank Elementary School "Teaching Computer Programming in a Middle School with Underrepresented Groups", Spencer Krautkraemer, Math Teacher, Esparto K-8 Advisory Commentators: David N. Butler, CEO, NextEd Dr. Richard T. Scalettar, Professor, Physics Department, UC Davis	Conference Room A
Session 3	 Closing the Achievement Gap in STEM Education for Underrepresented Groups, at-Risk Students, Alternative Schools Chair: Renee Newton, Director, CRESS Center, UC Davis Co-Chair: Louise Stymeist, Curriculum Specialist CTE & Court/Community Schools, Sacramento County Office of Education, Presenters: "Enhancing Academic Literacy and Collaborative Conversations through Dual Programming using C/C++ Interpreter Ch and Modular Robots," Suzie Dollesin, Curriculum and Instruction Coordinator, Twin Rivers Unified School District "Inspiring Students from the Underrepresented Groups with Robotics ", Dubarrie Fagout, CTE Teacher, River City High School "Engaging Students in an Underperforming School with Computing and Robotics in Algebra and Computer Programming courses and Afterschool Program", Carmen Wright, Math Teacher, Elkhorn Village Elementary School "Next Generation Science Standards in the C-SETM Curriculum, Integrating NGSS into a Science Course and Afterschool Program", Marie Mafe Aguilar, Science Teacher, California Middle School "Learning Algebra with Computing and Robotics in 7th Period at an Urban High School", Warren Schnack, Math Teacher, Luther Burbank High School "Learning Students in an Alternative School with RoboPlay Competitions", Terry Ahrens, ROP Teacher, Sacramento County Office of Education 	Conference Room B





	Advisory Commentators: Dr. Ronda Adams, Associate Superintendent, Yolo County Office of Education Scott Spector, Education Programs Consultant, California Department of Education	
Session 4	Demonstration of teaching materials with Integrated C-STEM curriculum for Computer Programming, Algebra, Physical Science, Robotics, Engineering Presenters: Ryan Mangan, Engineering Teacher, School of Engineering and Sciences Dylan Besk, Math and Engineering Teacher, School of Engineering and Sciences	Alumni Center Allewelt Conference Room
12:15pm – 12:45	Lunch (playing RoboPlay Competitions videos)	Ballroom A, B, C
12:45-1:30	Featured Speech: Computing Education for Students and Schools Chair: Dr. Enrique Lavernia, Distinguished Professor and Dean of College of Engineering Speaker: Professor Debra Richardson, Chair of Alliance for California Computing Education for Students and Schools (ACCESS), UC Irvine	Ballroom A, B, C
1:30 - 1:45	Break	
1:45-2:45	Breakout Presentation, Discussion, and Demo Sessions (With the same presenters at 11:15am-12:15pm)	
Session 1	 Integrated Algebra Education with Computer Science, Technology, and Engineering Chair: William Spalding, Assistant Superintendent, Washington Unified School District Co-Chair: Ted Appel, Principal, Luther Burbank High School Presenters: "Common Core Math Standards in the C-STEM Curriculum, Engaging Female Students Learning Algebra I with Hands-on Computing and Robotics", Heidi Espindola, Math Teacher, St. Francis Catholic High School "Learning Pre-Algebra with Computing and Robotics for All Students in the 7th Grade", Dylan Besk, Math and Engineering Teacher, School of Engineering and Sciences "Integrating Computing and Robotics into Algebra I with ESL Students Group Teaching and Collaborative Learning", Clay Dagler, Math Teacher, Luther Burbank High School "Collaboratively Learning Algebra, Computing and Robotics in Classroom and Afterschool Program with Math Programming and RoboPlay Competitions", Francesca DeFazio, Math Teacher, Westmore Oaks Elementary School "Integrating Computer Programming into Engineering and Algebra I Education", Thom Bauser, Science and Engineering Teacher, School of Engineering and Sciences Advisory Commentators: Matt Turkie, Principal, School of Engineering and Sciences Dr. Matthew T Portillo, 4-H Youth Development Program Advisor, 	Ballroom B





	President of the California 4-H Association, UC Agriculture & Natural Resources Frank Pisi , Director, California Afterschool Network	
Session 2	 Integrated Computing, Science, Engineering, and Career Technical Education (CTE) Chair: Aida Buelna, Superintendent, Esparto Unified School District Co-Chair: Dan Park, Principal, Fred C Beyer High School, Presenters: "CTE Standards in the C-STEM Curriculum, Integrating Computer Programming, Robotics, and 3D Design and 3D Printing into Applied Physics Education", Chris Schlesselman, Physics and Engineering Teacher, Hiram Johnson High School "Integrating Math Programming into Robotics Academy", Dr. Liliana Lazo, Math Teacher, Fred C Beyer High School "Integrating C-STEM Computing and Mobot Program into Science, Algebra, and Afterschool Program in a Middle School with One-to- One Computing/PBL Environment ", Tammy Lee, Math Teacher, American Canyon Middle School "Next Generation Science Standards in the C-STEM Curriculum, Integrating Computing and Robotics into Science Education", Jada Saul, Science Teacher, Riverbank Elementary School "Teaching Computer Programming in a Middle School with Underrepresented Groups", Spencer Krautkraemer, Math Teacher, Esparto K-8 Advisory Commentators: Larry Carrillo, Manager, Sandia National Laboratories Veronica Michael, Principal, Esparto K-8 	Conference Room A
Session 3	 Closing the Achievement Gap in STEM Education for Underrepresented Groups, at-Risk Students, Alternative Schools Chair: Clark Bryant, Associate Superintendent, Davis Joint Unified School District Co-Chair: Lisa Smith, Principal, Elkhorn Village Elementary School, Presenters: "Enhancing Academic Literacy and Collaborative Conversations through Dual Programming using C/C++ Interpreter Ch and Modular Robots," Suzie Dollesin, Curriculum and Instruction Coordinator, Twin Rivers Unified School District "Inspiring Students from the Underrepresented Groups with Robotics ", Dubarrie Fagout, CTE Teacher, River City High School "Engaging Students in an Underperforming School with Computing and Robotics in Algebra and Computer Programming courses and Afterschool Program", Carmen Wright, Math Teacher, Elkhorn Village Elementary School "Next Generation Science Standards in the C-SETM Curriculum, Integrating NGSS into a Science Course and Afterschool Program", Marie Mafe Aguilar, Science Teacher, California Middle School "Learning Algebra with Computing and Robotics in 7th Period at an Urban High School", Warren Schnack, Math Teacher, Luther Burbank High School "Inspiring Students in an Alternative School with RoboPlay 	Conference Room B





	Competitions", Terry Ahrens , ROP Teacher, Sacramento County Office of Education Advisory Commentators: Linda Christopher, Director of Educational Innovation, NextEd Joe Stymeist, CTE Coordinator, Sacramento City Unified School District Philip Romig, Science Curriculum Specialist, Sacramento County Office of Education	
Session 4	Demonstration of teaching materials with Integrated C-STEM curriculum for Computer Programming, Algebra, Physical Science, Robotics, Engineering Presenters: Ryan Mangan, Engineering Teacher, School of Engineering and Sciences Clay Dagler, Math Teacher, Luther Burbank High School	Alumni Center Allewelt Conference Room
2:45 – 3:00	Coffee Break	Conference Center Foyer
3:00-4:00	Reflection and Open Discussions Chair: Harry H. Cheng, Professor and C-STEM Center Director, UC Davis Co-Chair: Karen Shores, STEM Administrator, California Department of Education Panelists: Dr. Ronda Adams, Associate Superintendent, Yolo County Office of Education Garth Lewis, Jr., Director, Secondary Education, Assessment, and Professional Development, Woodland Joint Unified School District	Ballroom A, B, C

Organizers: UC Davis Center for Integrated Computing and STEM Education, UC Davis College of Engineering.

Financial Sponsors: National Science Foundation, UC Davis College of Engineering, Sandia National Laboratories



Partners: UC Davis School of Education, UC Davis Division of Math and Physics Science, UC Davis College of Agricultural and Environmental Science, California Department of Education, Yolo County Office of Education, Davis Joint Unified School District, Esparto Unified School District, Washington Unified School District, Sacramento County Office of Education, Sacramento City Unified School District, Napa Valley Unified School District, Modesto City Unified School District, Butte County Office of Education, Woodland Unified School





District, Solano County Office of Education, NextEd, California STEM Learning Network, UC Davis CRESS Center, California Afterschool Network, California 4-H Association









California STEM Learning Network







Keynote Speaker

Provost and Executive Vice Chancellor Ralph J. Hexter, UC Davis

Ralph Hexter arrived at UC Davis on January 1, 2011, to become provost & executive vice chancellor. He also holds an appointment as distinguished professor of classics and comparative literature.

As provost and executive vice chancellor, he serves as the number two person in the UC Davis administration, reporting directly to Chancellor Linda P.B. Katehi and representing the chancellor in her absence. He is the campus' chief academic officer and, in that post, oversees the work of the deans and serves as the chancellor's principal liaison to the Academic Senate. Provost & Executive Vice Chancellor Hexter is responsible for guiding the development of academic priorities and strategies; working with the deans to recruit and retain a diverse and talented faculty; and in coordination with the chancellor, leading the university's strategic planning process, allocating resources to advance



strategic priorities, and, with his fellow vice chancellors, managing the daily operation of the campus.

From 2005 to 2010, Hexter served as president of Hampshire College in Amherst, Massachusetts, a selective liberal arts college with 1,500 students known for its innovative student-centered pedagogy and curriculum. Shortly after he arrived at Hampshire, he launched a comprehensive revisioning exercise to focus the college on its future as it neared its 40th anniversary, celebrated in 2010. In addition, he added to his president's cabinet a special assistant for diversity and multicultural education; completed fundraising for what became the college's first building to receive LEED gold environmental certification; and, through a generous grant from the Andrew W. Mellon Foundation, laid the groundwork for a deeper integration of the study of languages other than English into the college's courses and individual student and faculty projects.

Hexter received his A.B. degree in English literature from Harvard College in 1974. He earned a B.A. and M.A. in classics and modern languages at Oxford's Corpus Christi College in 1977 and 1982, respectively. He also earned an M.Phil. and a Ph.D. in comparative literature from Yale University in 1979 and 1982, where he taught in the classics department from 1981 to 1991. During his final year at Yale, he served as acting associate dean of the Graduate School. In 1991, he moved as professor of classics and comparative literature to the University of Colorado at Boulder, where he directed the graduate program in comparative literature. In 1995, he joined the faculty at the University of California, Berkeley also as professor of classics and comparative literature, dean of Arts and Humanities and executive dean of the College of Letters and Science, the last two concurrently. At Berkeley, Hexter successfully recruited and retained faculty under intense competition from other universities, and he was active in securing philanthropic support for UC Berkeley from individuals and foundations.





Featured Speaker Professor Debra Richardson, UC Irvine

Debra J. Richardson joined the UC Irvine faculty in 1987, and became chair of the department of Information and Computer Science (ICS) in July 2000. Under her leadership, the department was promoted to the first computing-focused school in UC system in December 2002, and she was appointed the Ted and Janice Smith Dean of the new school. She was instrumental in securing a transformational six-figure endowment for the school, resulting in naming the school after philanthropist Donald Bren. She served as dean through June 2010.

Richardson is a Professor of Informatics. She pioneered research in "specification-based testing," whereby formal methods are employed to guide software testing. Her current work focuses on adapting software engineering techniques to socially relevant domains. She has authored over 150 peer-reviewed publications.



Her research has been recognized by designation as a Fellow of Automated Software Engineering and also with two retrospective impact awards from ACM SIGSoft.

Richardson has always been committed to increasing the participation of women and other underrepresented minorities in computing. She has served on the leadership team of the National Center for Women and Information Technology (NCWIT) since its inception and heads up UC Irvine's NCWIT PaceSetter team. She engages to improve computer science education, in part by chairing ACM's Computer Science Teachers Association (CSTA) Advisory Council and also chairing the Alliance for California Computing Education for Students and Schools (ACCESS). She also serves on the ACM Education Board, and chaired Computer Science Education Week (CSEdWeek) during its second and third years.

Richardson received her B.A. in Mathematics from the University of California at San Diego and her M.S. and Ph.D. in Computer and Information Science at the University of Massachusetts.





Plenary Speaker Superintendent Jonathan P. Raymond, Sacramento City Unified School District

Jonathan Raymond is Superintendent of the Sacramento City Unified School District, California's 11th largest school district (47,000 students) located in the heart of the state capital. Since his appointment in July 2009, Raymond has accomplished several objectives of the district's Strategic Plan 2010-14: Putting Children First, including: the creation of seven Superintendent's Priority Schools to offer extra assistance to the district's most academically troubled campuses; the implementation of Early Kinder, a two-year transitional kindergarten program aimed at ending the cycle of "start behind, stay behind,"; the development of Chinese and Hmong language immersion programs; the expansion of high school Linked Learning academies to provide college and career bound students with real-world experiences; a phased-in implementation of Common Core Standards to add rigor and relevance to curriculum; and the historic adoption of the "Sacramento High Performing Schools Compact," a commitment to improving



Sacramento's educational climate signed by the district and charter school providers and supported by the Gates Foundation. In addition, under Raymond's leadership the district became the first on the West Coast to be awarded a fully funded Green Fellow from the US Green Building Council, a position critical to ensuring the environmental sustainability of SCUSD's 81 campuses. Prior to his appointment, Raymond, a graduate of Tufts University, George Mason Law School and the Broad Superintendents Academy, served as Chief Accountability Officer for Charlotte-Mecklenburg Schools. Raymond's extensive experience extends beyond education: He was president and CEO of the non-profit, Boston-based Commonwealth Corporation; a deputy director in the Massachusetts Department of Labor and Workforce Development; and a private practice attorney specializing in business and labor law.





C-STEM Teacher of the Year

Mafe Aguilar, Science Teacher California Middle School Sacramento City Unified School District





Dylan Besk, Math Teacher School of Engineering and Sciences Sacramento City Unified School District

Clayton Dagler, Math Teacher Luther Burbank High School Sacramento City Unified School District









Liliana Lazo, Math and Engineering Teacher Fred C Beyer High School Modesto City Schools

Ryan Mangan, Science and Engineering Teacher School of Engineering and Sciences Sacramento City Unified School District







C-STEM School of the Year

School of Engineering and Sciences Sacramento City Unified School District Principal Matt Turkie









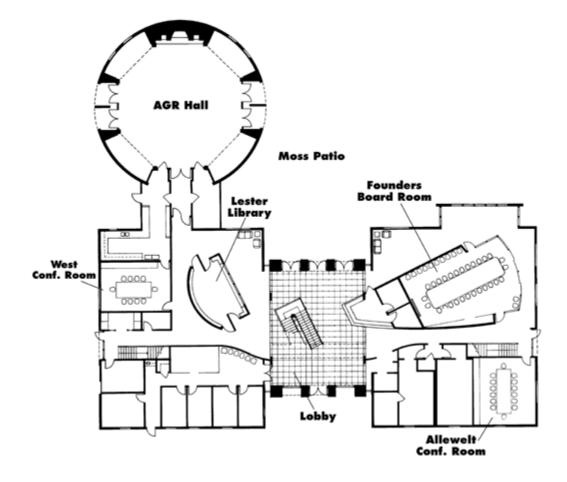
Conference Parking and Building Location







Alumni Center Layout







Conference Center Layout



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